Reply to Office Action of 05/26/2005   Appl. No.: 09/824,844
Amendment Dated: August 16, 2005   Attorney Docket No.: CSCO-007/3484

Listing of Claims

1   1.   (Currently Amended): A method of processing a command requesting

2   information on any intermediate layer-2 devices present in a route from a first system to

3   a second system, said any intermediate devices being contained in a network implemented

4   on a broadcast medium, said network containing a plurality of devices including said any

5   intermediate devices, said method comprising:

6   receiving said command in a receiving device;

7   ——determining a first layer-2 device which is connected directly to said first system,

8   logically viewing said first layer-2 device as a present layer-2 device if said second system

9   is also not directly connected to said first layer-2 device;

10   sending a request packet from said receiving device to said a present layer-2 device

11   requesting information on whether said second system is connected directly to said present

12   layer-2 device;

13   ˙receiving by said receiving device a response packet from said present layer-2

14   device, wherein said response packet indicates whether said second system is connected

15   directly to said present layer-2 device, wherein said response packet further identifies a

16   subsequent layer-2 device in a route from said present layer-2 device to said second system

17   if said second system is not connected directly to said present layer-2 device, wherein said

18   subsequent layer-2 device is next to said present layer-2 device in said route to said second

19   system; and

20   repeating by said receiving device said sending and receiving by using said

21   subsequent layer-2 device in the place of said present layer-2 device until said response

22   packet indicates that said second system is directly connected to said present layer-2

23   device.

1   2.   (Currently Amended): The method of claim 1, wherein a receiving device

2   receives said command, and wherein said receiving device is not directly connected to said

3   first layer-2 device, wherein said determining further comprises:

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4   locating a directly connected device which is connected directly to said first system;

5   using said directly connected device as said present layer-2 device, wherein said

6 locating and said using are performed before said sending; and

7   performing said repeating in said receiving device to determine said route.

1   3. (Original): The method of claim 2, wherein said locating comprises:

2   substituting said receiving device as said first layer-2 device; and

3   performing said repeating to determine said directly connected device.

1   4. (Previously Amended): The method of claim 2, wherein said locating comprises

2 sending a multicast packet directed to said plurality of devices, said multicast packet

3 containing an identifier of said first system, wherein each of said plurality of devices is

4 designed to respond indicating if said first system is connected directly to the device.

1   5. (Currently Amended): The method of claim 1, further comprising:

2   determining a first layer-2 device which is connected directly to said first system,

3 logically viewing said first layer-2 device as a present layer-2 device if said second system

4 is also not directly connected to said first layer-2 device:

5   wherein said determining, sending, receiving, and repeating are is also performed

6 in a by said receiving device.

1   6. (Original): The method of claim 5, further comprising providing a command line

2 interface to enable a network administrator to enter said command on said receiving

3 device.

1   7. (Previously Amended): The method of claim 1, wherein said second system is

2 deemed to be directly connected to said first layer-2 device if said second system is

3 connected to a port of said first layer-2 device.

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1   8. (Original): The method of claim 7, further comprising:

2   receiving in said receiving device a neighbor packet from a neighbor device on at

3   least one port; and

4   concluding in said receiving device that a system communicating on another port

5   is connected directly to said another port by the absence of reception of neighbor packets

6   on said another port.

1   9. (Original): The method of claim 8, wherein said network is implemented using

2   Ethernet/802.3 protocol.

1   10. (Original): The method of claim 1, wherein said request packet and said

2   response packet are generated consistent with UDP/IP protocol.

1   11. (Currently Amended): The method of claim 1, wherein said ~~determining,~~

2   sending, receiving, and repeating are performed in a computer system.

1   12. (Currently Amended): A method of supporting the tracing of a route containing

2   a sequence of layer-2 devices between a first system and a second system, said method

3   being performed in a <u>layer-2</u> device forming a part of a network, said method comprising:

4   receiving in said <u>layer-2</u> device a request packet <u>from a central device, said request</u>

5   <u>packet</u> containing an identifier for said second system, wherein said request packet

6   requests information on whether said second system is connected directly to said <u>layer-2</u>

7   device;

8   determining in said <u>layer-2</u> device whether said <u>layer-2</u> device is connected directly

9   to said second system;

10   generating in said <u>layer-2</u> device a response packet, wherein said response packet

11   indicates whether said second system is connected directly to said <u>layer-2</u> device; and

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12   sending from said layer-2 device to said central device said response packet

13   irrespective of whether said central device is in said route or whether said layer-2 device

14   is a last device in said route.

1   13. (Currently Amended): The method of claim 12, wherein said generating further

2   comprises:

3   identifying in said layer-2 device a next device, wherein said next device is next to

4   said layer-2 device in a route from said first system to said second system; and

5   including data identifying said next device in said response packet.

1   14. (Currently Amended): The method of claim 13, wherein said identifying

2   comprises:

3   examining a table in said layer-2 device to determine a port on which said second

4   system communicates; and

5   locating a device connecting on said port, wherein said located device comprises

6   said next device.

1   15. (Original): The method of claim 14, wherein said locating comprises:

2   receiving a neighbor packet from said next device on said port indicating a next

3   device identifier identifying said next device; and

4   including said next device identifier in said response packet.

1   16. (Currently Amended): The method of claim 15, wherein said first system is

2   deemed to be connected directly to said layer-2 device if said first system is present on a

3   port of said layer-2 device, wherein determining is based on the absence of reception of

4   said neighbor packet on said port.

1   17. (Currently Amended): An apparatus processing a command requesting

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2   information on any intermediate layer-2 devices present in a route from a first system to

3   a second system, said any intermediate devices being contained in a network implemented

4   on a broadcast medium, said network containing a plurality of devices including said any

5   intermediate devices, said apparatus comprising:

6   means for receiving said command <u>in a receiving device</u>;

7   ~~means for determining a first layer-2 device which is connected directly to said first~~

8   ~~system, logically viewing said first layer-2 device as a present layer-2 device if said second~~

9   ~~system is also not directly connected to said first layer-2 device;~~

10   means for sending a request packet <u>from said receiving device</u> to ~~said~~ <u>a</u> present

11   layer-2 device requesting information on whether said second system is connected directly

12   to said present layer-2 device;

13   means for receiving a response packet from said present layer-2 device, wherein

14   said response packet indicates whether said second system is connected directly to said

15   present layer-2 device, wherein said response packet further identifies a subsequent layer-2

16   device in a route <u>from said present layer-2 device</u> to said second system if said second

17   system is not connected directly to said present layer-2 device, wherein said subsequent

18   layer-2 device is next to said present layer-2 device in said route to said second system;

19   and

20   means for repeating said sending and receiving by using said subsequent layer-2

21   device in the place of said present layer-2 device until said response packet indicates that

22   said second system is directly connected to said present layer-2 device

23   <u>wherein said means for receiving and said means for repeating are also contained</u>

24   <u>in said receiving device.</u>

1   18. (Currently Amended): The apparatus of claim 17, ~~wherein a receiving device~~

2   ~~receives said command, and~~ wherein said receiving device is not directly connected to said

3   first layer-2 device, wherein said means for determining further comprises:

4   means for locating a directly connected device which is connected directly to said

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5   first system;

6   means for using said directly connected device as said present layer-2 device; and

7   means for performing said repeating to determine said route, said means for

8   performing being contained in said receiving device.

1   19. (Previously Amended): The apparatus of claim 18, wherein said means for

2   locating comprises:

3   means for substituting said receiving device as said first layer-2 device; and

4   means for performing said repeating to determine said directly connected device.

1   20. (Previously Amended): The apparatus of claim 18, wherein said means for

2   locating comprises sending a multicast packet directed to said plurality of devices, said

3   multicast packet containing an identifier of said first system, wherein each of said plurality

4   of devices is designed to respond indicating if said first system is connected directly to the

5   device.

1   21. (Currently Amended): A layer-2 device for supporting the tracing of a route

2   containing a sequence of layer-2 devices between a first system and a second system, said

3   layer-2 device being comprised in a network based on broadcast medium, said layer-2

4   device comprising:

5   means for receiving in said layer-2 device a request packet from a central device,

6   said request packet containing an identifier for said second system, wherein said request

7   packet requests information on whether said second system is connected directly to said

8   layer-2 device;

9   means for determining in said layer-2 device whether said layer-2 device is

10   connected directly to said second system;

11   means for generating in said layer-2 device a response packet, wherein said

12   response packet indicates whether said second system is connected directly to said layer-2

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13   device; and

14   means for sending from said layer-2 device to said central device said response

15   packet irrespective of whether said central device is in said route or whether said layer-2

16   device is a last device in said route.

1   22. (Previously Amended): The layer-2 device of claim 21, wherein said means for

2   generating further comprises:

3   means for identifying in said layer-2 device a next device, wherein said next device

4   is next to said layer-2 device in a route from said first system to said second system; and

5   means for including data identifying said next device in said response packet.

1   23. (Currently Amended): The layer-2 device of claim 22, wherein said means for

2   identifying comprises:

3   means for examining a table in said layer-2 device to determine a port on which

4   said second system communicates; and

5   means for locating a device connecting on said port, wherein said located device

6   comprises said next device.

1   24. (Currently Amended): The layer-2 device of claim 23, wherein said means for

2   locating comprises:

3   means for receiving a neighbor packet from said next device on said port indicating

4   a next device identifier identifying said next device; and

5   means for including said next device identifier in said response packet.

1   25. (Currently Amended): The layer-2 device of claim 23, wherein said first system

2   is deemed to be connected directly to said layer-2 device if said first system is present on

3   a port of said layer-2 device, wherein determining is based on the absence of reception of

4   said neighbor packet on said port.

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1   26. (Currently Amended): A computer readable medium carrying one or more

2   sequences of instructions for causing a device to process a command requesting

3   information on any intermediate layer-2 devices present in a route from a first system to

4   a second system, said any intermediate devices being contained in a network implemented

5   on a broadcast medium, said network containing a plurality of devices including said any

6   intermediate devices, wherein execution of said one or more sequences of instructions by

7   one or more processors contained in said device causes said one or more processors to

8   perform the actions of:

9   receiving said command <u>in a receiving device</u>;

10   ~~determining a first layer-2 device which is connected directly to said first system,~~

11 ~~logically viewing said first layer-2 device as a present layer-2 device if said second system~~

12 ~~is also not directly connected to said first layer-2 device;~~

13   sending a request packet <u>from said receiving device</u> to ~~said~~ <u>a</u> present layer-2 device

14 requesting information on whether said second system is connected directly to said present

15 layer-2 device;

16   receiving <u>by said receiving device</u> a response packet from said present layer-2

17 device, wherein said response packet indicates whether said second system is connected

18 directly to said present layer-2 device, wherein said response packet further identifies a

19 subsequent layer-2 device in a route <u>from said present layer-2 device</u> to said second system

20 if said second system is not connected directly to said present layer-2 device, wherein said

21 subsequent layer-2 device is next to said present layer-2 device in said route to said second

22 system; and

23   repeating <u>by said receiving device</u> said sending and receiving by using said

24 subsequent layer-2 device in the place of said present layer-2 device until said response

25 packet indicates that said second system is directly connected to said present layer-2

26 device.

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1   27. (Currently Amended): The computer readable medium of claim 26, ~~wherein~~

2   ~~said command is received in a receiving device~~, wherein said receiving device is not

3   directly connected to said first layer-2 device, ~~wherein said determining~~ further comprises:

4   locating a directly connected device which is connected directly to said first system;

5   using said directly connected device as said present layer-2 device, wherein said

6   locating and said using are performed before said sending; and

7   performing said repeating in said receiving device to determine said route.

1   28. (Original): The computer readable medium of claim 27, wherein said locating

2   comprises:

3   substituting said receiving device as said first layer-2 device;

4   third performing said repeating;

5   using a last one of said present-layer 2 determined by said third performing as said

6   directly connected device.

1   29. (Previously Amended): The computer readable medium of claim 27, wherein

2   said locating comprises sending a multicast packet directed to said plurality of devices,

3   said multicast packet containing an identifier of said first system, wherein each of said

4   plurality of devices is designed to respond indicating if said first system is connected

5   directly to the device.

1   30. (Currently Amended): The computer readable medium of claim 26, further

2   comprising:

3   ___ determining a first layer-2 device which is connected directly to said first system,

4   logically viewing said first layer-2 device as a present layer-2 device if said second system

5   is also not directly connected to said first layer-2 device;

6   wherein said determining, sending, receiving, and repeating are performed ~~in a~~ by

7   said receiving device.

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1   31. (Original): The computer readable medium of claim 30, further comprising

2   providing a command line interface to enable a network administrator to enter said

3   command on said receiving device.

1   32. (Previously Amended): The computer readable medium of claim 26, wherein

2   said second system is deemed to be directly connected to said first layer-2 device if said

3   second system is connected to a port of said first layer-2 device.

1   33. (Original): The computer readable medium of claim 32, further comprising:

2   receiving in said receiving device a neighbor packet from a neighbor device on at

3   least one port; and

4   concluding in said receiving device that a system communicating on another port

5   is connected directly to said another port by the absence of reception of neighbor packets

6   on said another port.

1   34. (Original): The computer readable medium of claim 33, wherein said network

2   is implemented using Ethernet/802.3 protocol and said request packet and said response

3   packet are generated consistent with UDP/IP protocol.

1   35. (Currently Amended): A computer readable medium carrying one or more

2   sequences of instructions for causing a <u>layer-2</u> device to support the tracing of a route

3   containing a sequence of layer-2 devices between a first system and a second system, said

4   <u>layer-2</u> device being comprised in a network based on broadcast medium, wherein

5   execution of said one or more sequences of instructions by one or more processors

6   contained in said <u>layer-2</u> device causes said one or more processors to perform the actions

7   of:

8   receiving in said <u>layer-2</u> device a request packet <u>from a central device, said request</u>

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9   packet containing an identifier for said second system, wherein said request packet

10   requests information on whether said second system is connected directly to said layer-2

11   device;

12   determining in said layer-2 device whether said layer-2 device is connected directly

13   to said second system;

14   generating in said layer-2 device a response packet, wherein said response packet

15   indicates whether said second system is connected directly to said layer-2 device; and

16   sending from said layer-2 device to said central device said response packet

17   irrespective of whether said central device is in said route or whether said layer-2 device

18   is a last device in said route.

1   36.   (Currently Amended): The computer readable medium of claim 35, wherein